Journal of Computers Vol. 30 No. 1, 2019, pp. 223-236
doi:10.3966/199115992019023001021

Study on Evaluation of Mobile Office System's Security and Reliability

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Received 1 August 2018; Revised 1 September 2018; Accepted 1 October 2018

Abstract. From the aspect of system theory, this paper studies the mobile office model, and defines the relevant concepts of mobile office system clearly, such as framework, basic elements and their roles as well as their interrelationships. In this paper, the risk factors and characteristics existing in mobile office activities are analyzed, the risk assessment method from different angles and starting points is explored, the selection principle and method of evaluation indexes is discussed, and a fuzzy comprehensive evaluation method is put forward to verify the safety and reliability of our mobile office system.

Keywords: fuzzy comprehensive assessment, mobile office system, system reliability

1 Introduction

The security and reliability of a mobile office system is the basic characteristic to ensure the system work normally. Basic security features of a mobile office system include vulnerability, confidentiality, reliability and availability [10]. The main purpose of vulnerability is to ensure the integrity of the whole system and its constituent parts, to support operation and to repair itself when risks such as intrusion occur. Confidentiality is mainly to ensure the confidentiality of information, data, authorization and identity during the operation of the system. Reliability is to ensure the integrity and accuracy of the whole mobile office system and its constituent parts, and to ensure that they are not tampered with, impersonated and forged. Availability is ensuring that authorized persons can use the system within available time and space. The level of safety and reliability refers to that each safety feature needs to meet the required degree of safety and reliability and indicators for users to use safely according to specific requirements. The level of safety and reliability is the comprehensive result of all safety features [1, 8-10]. Therefore, in order to provide a theoretical basis and practice guidance for judging and preventing a possible risk events, this paper makes clear the definition, framework, elements of a safety and reliability mobile office system based on the multistage and whole process firstly, reframes evaluation index selection principle and selection method based on a fuzzy comprehensive evaluation method.

2 Composition of Safety and Reliability Evaluation System

System safety and reliability assessment is realized by expert evaluation of different security domain and data analysis. Expert evaluation is referred to experts' using some evaluation tools to monitor and evaluate the contents and indexes contained in vulnerability, confidentiality, reliability and availability.

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Then the experts give an evaluation report about the safety and reliability of the system, and finally some suggestions are given for making a safe and dependable system. The main body formation of a safety and reliability model is shown in Fig. 1.

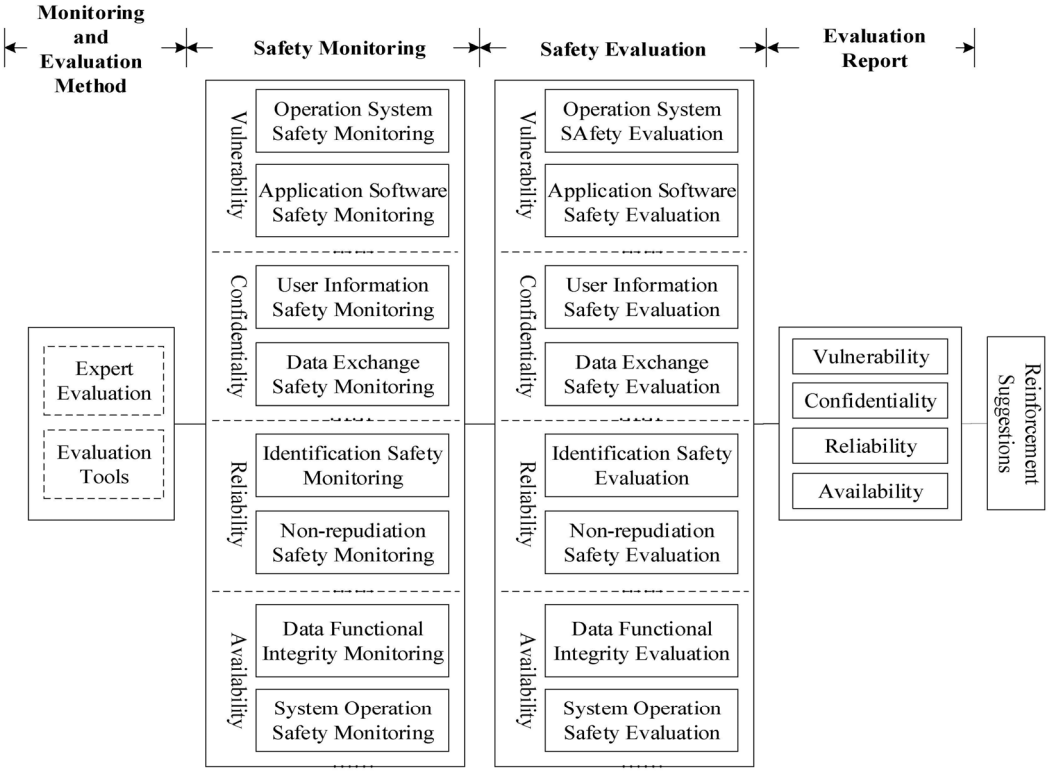

Fig. 1. Main body formation of a safety and reliability model

2.1 Analysis of Safety and Reliability Evaluation Index System

Construction process of safety and reliability evaluation index system. In the process of safety and reliability evaluation, the source of main evaluation indexes set is formed [2]. The original index database is established according to various elements distribution. Then the usage frequency of each index is counted, and the indexes with higher frequency is selected. Finally, an index system is determined according to industry experts scoring results and theoretical analysis. The construction process of safety and reliability evaluation index system is shown in Fig. 2.

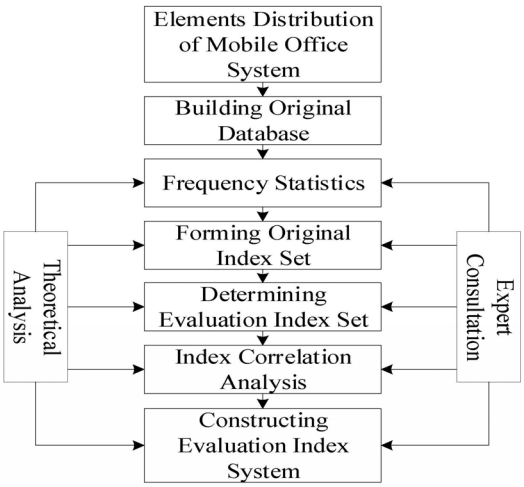

Fig. 2. Construction process of safety and reliability evaluation index system

Grade analysis of safety and reliability. Firstly, the element set of safety and reliability evaluation are determined according to the distribution of system composition elements. Then, through the comparative analysis of each element in the set, the elements with high representation are selected as the evaluation index by expert scoring method and questionnaire survey. Finally, the safety and reliability grade is determined. However, in order to determine the safety and reliability grade, the safety and reliability characteristics of system must be determined firstly because the safety and reliability grade is a comprehensive measurement of system vulnerability, confidentiality, reliability and availability. The relationships among safety and reliability grade, characteristics and evaluation indexes are shown in Fig. 3.

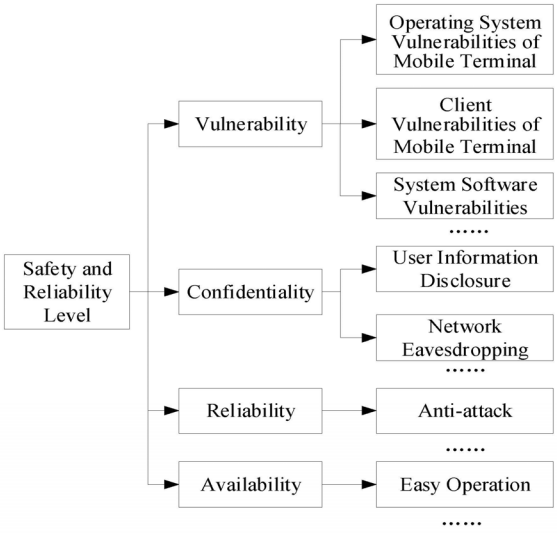

Fig. 3. Relationships of safety and reliability grade

In accordance with Fig. 3, the general goal of system evaluation is to obtain the safety and reliability grade. System vulnerability, confidentiality, reliability and availability are sub goals, and operating system vulnerabilities of mobile terminal are also indexes of safety and reliability grade evaluation. In other words, knowing the existence of risk is not an end, and knowing where the risk is and completing it is the end. Therefore, it is necessary to determine the impact domain of each evaluation index in order to determine the direction of improvement when evaluation indexes are determined. Based on the comprehensive analysis results obtained, we can know the index system of safety and reliability evaluation for a mobile office system, as shown in Table 1.

Table 1. The main body evaluation indexes of a mobile office system

General goal	Sub goal	Evaluation index	Reliability impact domain
Safety features	Vulnerability	Operating system vulnerability of mobile terminal	User
		Browser vulnerability of mobile terminal	
		Client vulnerability of mobile terminal	
		Vulnerability of wireless communication protocols	Mobile running system
		System software vulnerability	
		Software vulnerability	Mobile office system
		Database defects	
		Vulnerability of communication protocols	
		Vulnerability of network communication protocols	LAN
		Vulnerability of database	
		Destruction of communications or network resources	Public network

Table 1. The main body evaluation indexes of a mobile office system (continue)

General goal	Sub goal	Evaluation index	Reliability impact domain
	Confidentiality	Internet application of mobile terminal	User
		Upload traffic for internet applications	
		Download traffic for internet applications	
		Abnormal processes within the mobile terminal	
		User information leakage	Mobile running system
		Transaction information leakage	Mobile office system
		Network bugging	Wireless network
	Reliability	Not acknowledge the past trade	User
		Identity safety	Mobile running system
		Recoverability	
		Attack recognition capability	
		Anti-attack	
		Attack escalation mechanism	
		Self-repair capability	
		Fault-tolerant capability	Mobile office system
	Availability	Easy operation	User
		Information retransmission	Mobile running system
		Jurisdiction security	Mobile office system
		Data's integrity	
		Functional accuracy	

2.2 Safety and Reliability Analysis of System Running Process

Selection principles of evaluation indexes. The evaluation index system of system running process is a collection of indexes required to monitor the operation of various functions of mobile office system [3]. Before determining the indexes, the running process and functions of the mobile office system should be determined. In order to ensure the integrity and comprehensiveness of the evaluation, the determined operating process of the mobile office system should be the complete running process with all functions. The running process indexes are selected to form the original indexes data according to mobile terminal network access, user identity authentication and network data communication. Then we do frequency statistic on the original indexes data and select indexes of higher usage frequency as system evaluation indexes.

Safety and reliability of target system running process. The key points of safety and reliability of mobile office system's running process are network access and network data communication, which including user account, consistency, network, business flow, abnormal flow, port attack, safety tips and so on. Because it is the overall evaluation of the system running process, the corresponding risk domain of each monitoring evaluation index is the whole mobile office system. The safety and reliability grades of target system running process are shown in Table 2.

Table 2. The safety and reliability grades of target system running process

General goal	Sub goal	Evaluation angle of safety and reliability	Evaluation indexes
safety and reliability grades	Confidentiality	User Account Security Monitoring and Evaluation	The same account failed to log in every day for N consecutive days >= 5 times Multiple logins for the same account in a short time The same account used multiple terminals over a period of time Is the same session accessed more than one place? Number of users modifying and resetting passwords at the same time Number of consecutive password resets by the same user Number of users logged in roaming over time

Table 2. The safety and reliability grades of target system running process (continue)

General goal	Sub goal	Evaluation angle of safety and reliability	Evaluation indexes
safety and reliability grades	Confidentiality	Network security monitoring and evaluation	Network utilization rate Number of service timeouts over a period of time Time of business interruption Frequency of business interruptions
		Business Flow Security Monitoring and Assessment	Number and frequency of unacknowledged occurrences over a period of time Number and frequency of business submission failures over a period of time Number and frequency of business confirmation failures over a period of time User Information and Operating Frequency Operating across Territories over a Period of Time Number of operations on a single project over a period of time
		Monitoring and assessment of security incidents	Over a period of time, the number of accounts that failed to log in exceeded the threshold A single high-traffic download occurs The same pair of user accounts and external mailboxes continuously exchange information for many times
	Reliability	Mobile terminal consistency monitoring and evaluation	The Corresponding Relations between User Account and Mobile IMSI Number
		Online real-time monitoring and evaluation	Comprehensive Statistics of Safety Monitoring Projects Blacklist and White List Users Log in
		Abnormal flow monitoring and evaluation	Number of consecutive download operations for the same account Service delay Number of accounts on the same IP login system The Number and Frequency of Accessing Systems over the Same IP Period Number of accounts accessing login system in the same IP segment
		Port attack monitoring and evaluation	Systems ports under attack in the course of business Number and frequency of illegal requests received by business ports

2.3 Basic Information of the Evaluation System

System security in the existing system reliability evaluation is the main part of risk and operation risk, on the basis of the investigation and analysis, through a series of evaluation methods to determine mobile office system security and safety assessment of system security level, its significance lies in all safety related data through the investigation and statistical analysis, evaluate the system structure and operation process for mobile office security, the influence of the system for the future research and development, deployment and security put forward the corresponding strategy and operating safety, reduce the safety risk of mobile office, reducing safety accidents on the deployment of mobile office system the loss caused by the enterprises and institutions. As a result of the evaluation results correctly or not and the selection of evaluation indicators, is directly related to the quantitative evaluation level, and involves the main structure of mobile office system, mobile terminals, wireless network, mobile operators, Internet and LAN link of many factors, so the safety and reliability of the mobile office system to conduct a comprehensive evaluation index determine and quantify particularly important [4]. Taking the purpose of the evaluation, the characteristics of the evaluation object and the feasibility of the implementation of the evaluation method into consideration, the quantification principle of the selection of evaluation indicators is obtained, and the safety reliability grade of mobile office system is proposed by using the objective analysis.

2.3.1 Data Source

All the data are from the commissioned professional research institutions, and the questionnaire survey on the security of mobile office system is conducted, including famous security experts, senior users and partners in the field of mobile office, and experts are organized to score the survey results. Lead to data deviation is too large to avoid personal subjective reason, using expert scoring method to evaluate empirical steps at the same time, in order to avoid a single expert due to lack of experience data deviation is too big, at the same time to obtain the data preprocessing, delete the incomplete data, to ensure the rationality and validity of the data [5]. Finally, the data are analyzed, sorted and classified according to the security elements of mobile office system, and the required set of evaluation indexes and corresponding score sets are formed.

2.3.2 Establishment of Fuzzy Evaluation Model of the Assessed System

Determination of system index system. According to the analysis of mobile office system security risk is mainly composed of its own security and system operation process safety risk, the system itself security risks mainly with the system's own vulnerability, confidentiality, reliability and availability, operation process and system safety risk mainly related to the confidentiality and reliability of the system running environment. Therefore, based on the analysis of the reliability evaluation index, the security risk of the system itself and the security risk of the system operation process are taken as the primary indicators of the security reliability of the mobile office system, as shown in Fig. 4.

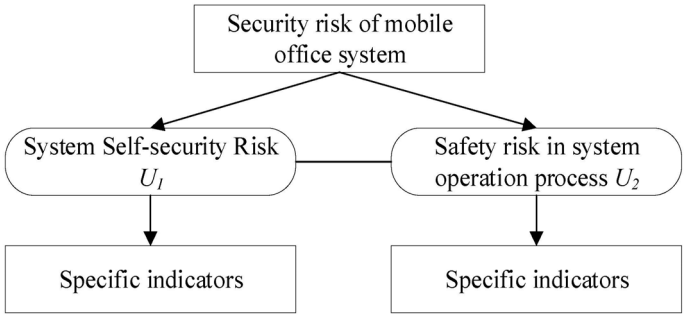

Fig. 4. First grade index for security risk of mobile office system

According to the analysis, the security risk of mobile office system can be divided into 4 categories of third-level risk as the second-level index, in which each secondary index is further refined into several third-level indexes, a total of 31 third-level indexes, as shown in Fig. 5. Security risks in the operation process of the system can be divided into two categories of three-level risks as secondary indicators, in which each secondary indicator is further refined into several three-level indicators, a total of 29 three-level indicators according to Table 1., as shown in Fig. 6.

3 Determine the Index Weight

According to the selection and weight determination methods of safety risk evaluation indexes of mobile office systems, experts and senior users with in-depth understanding and research on mobile office systems and network security risks of mobile communications are selected to build indexes at all levels through questionnaires and expert scoring [6].

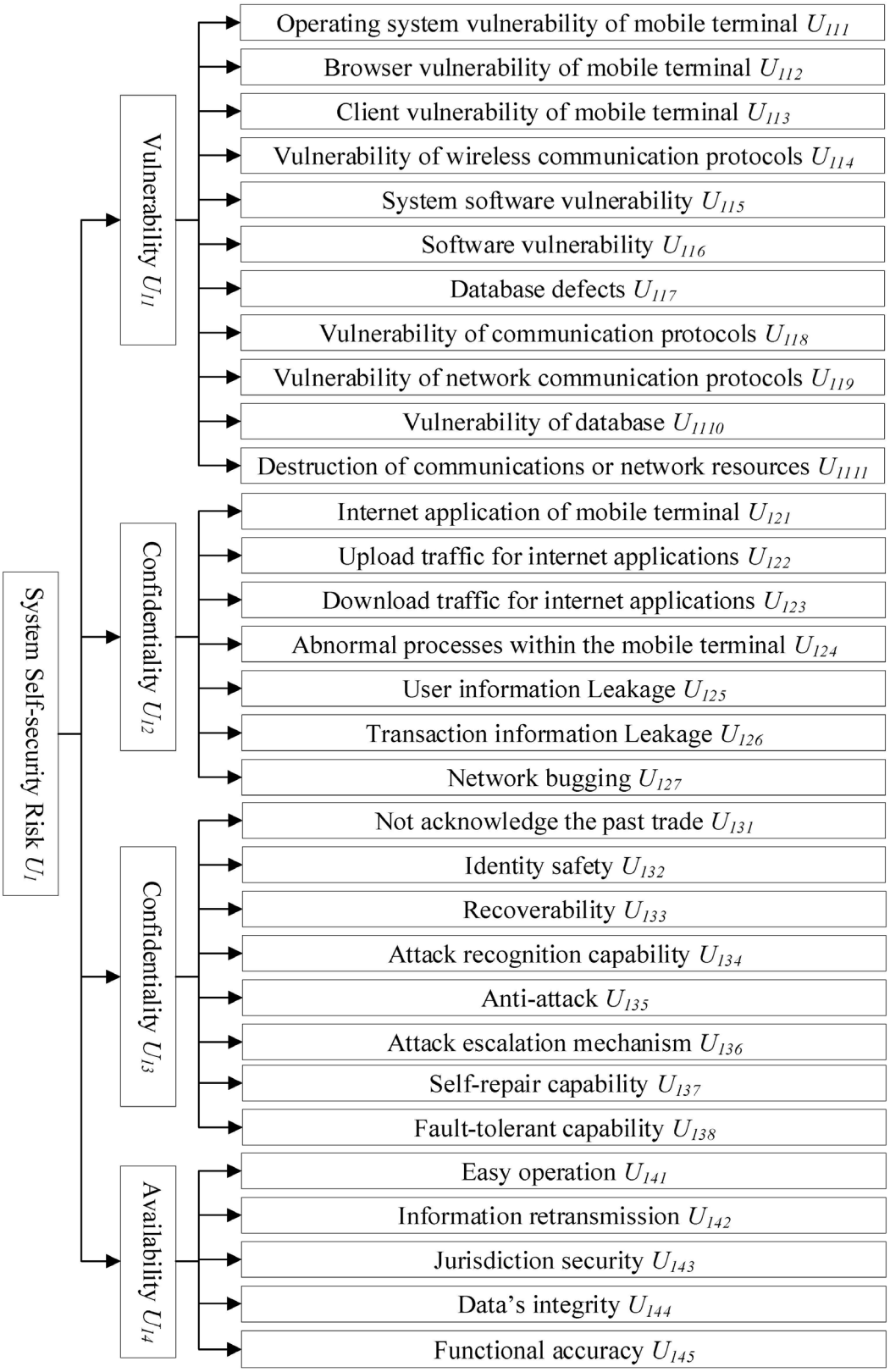

Fig. 5. Second and third grade index for security risk of mobile office system

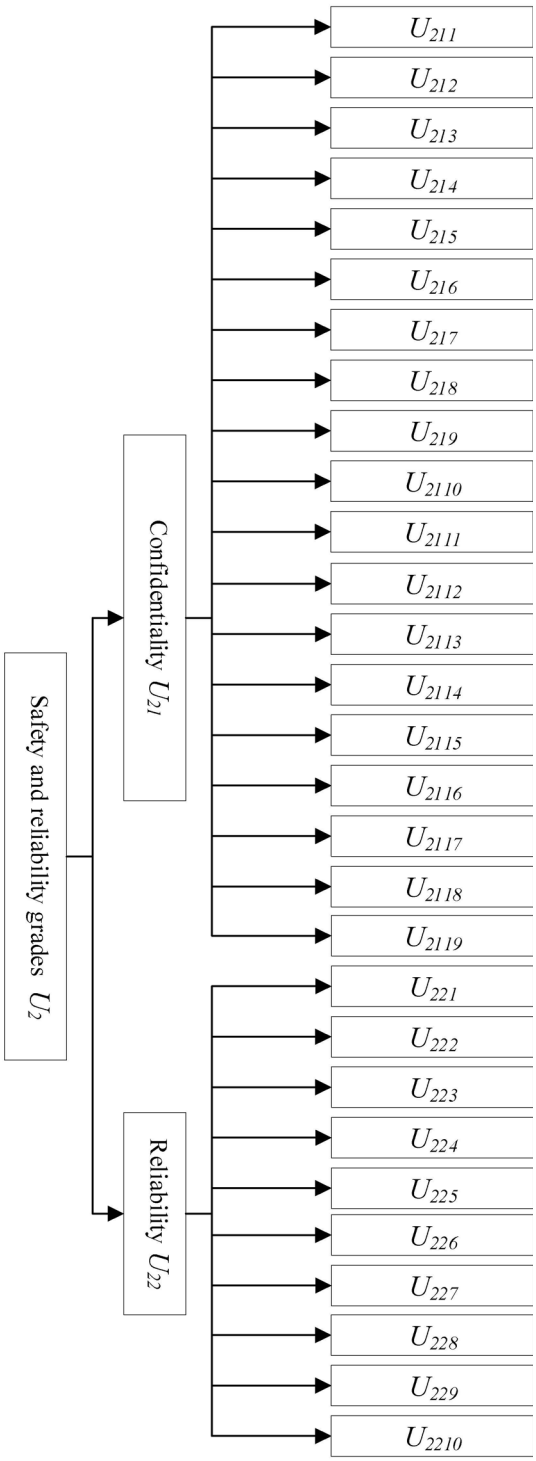

Fig. 6. Second and third grade index for mobile office system running process

3.1 The Estimating Matrix of the Total System Indicators is Shown in Table 3

Table 3. Estimating matrix for system general index

System total index	System Self-security Risk U_1	Safety risk in system operation process U_2
System Self-security Risk U_1	1	5
Safety risk in system operation process U_2	1/5	1

The paired comparison matrix generated from Table 3 corresponding to the total system indicators is:

$$A-(a_{ij})_{2\times 2}\begin{bmatrix}1 & 5\\ 1/5 & 1\end{bmatrix}. \tag{1}$$

the corresponding index weight of A is:

$$W_A=\begin{bmatrix}0.8333 & 0.1667\end{bmatrix}^T. \tag{2}$$

then

$$AW_A=\begin{bmatrix}1 & 5\\ 1/5 & 1\end{bmatrix}\begin{bmatrix}0.8333 & 0.1667\end{bmatrix}^T=\begin{bmatrix}0.16667 & 0.3333\end{bmatrix}^T. \tag{3}$$

the corresponding maximum eigenvalue of A is:

$$\lambda_A=\left(\frac{1.6667}{0.8333}+\frac{0.3333}{0.1667}\right)=2. \tag{4}$$

In addition, $CI=\dfrac{\lambda_A-2}{1}=0$. Therefore, the estimating matrix meets the requirements of consistency.

3.2 The Estimating Matrix of First-level Indicators is Shown in Table 4

Table 4. Estimating matrix for first grade index U_1

U_1	Vulnerability U_{11}	Confidentiality U_{12}	Reliability U_{13}	Availability U_{14}
Vulnerability U_{11}	1	1/5	1/4	4
Confidentiality U_{12}	5	1	5	9
Reliability U_{13}	4	1/5	1	5
Availability U_{14}	1/4	1/9	1/5	1

The paired comparison matrix generated from table 4 and corresponding is:

$$A_1=\begin{bmatrix}1 & 1/5 & 1/4 & 4\\ 5 & 1 & 5 & 9\\ 4 & 1/5 & 1 & 5\\ 1/4 & 1/9 & 1/5 & 1\end{bmatrix}. \tag{5}$$

The corresponding index weight based on the A_1 is:

$$W_{A_1}=\begin{bmatrix}0.1149 & 0.6285 & 0.2130 & 0.0437\end{bmatrix}^T. \tag{6}$$

$$A_1W_{A_1}=\begin{bmatrix}0.4862 & 2.6605 & 0.9015 & 0.1848\end{bmatrix}^T. \tag{7}$$

$$\lambda_{A_1}=4.2330. \tag{8}$$

Besides, $CI=\dfrac{\lambda_1-4}{3}=0.0741$ 、 $RI=0.89$, $CR=\dfrac{CI}{RI}=0.08<0.1$, therefore, the estimating matrix meets the requirement of consistency.

As we can know from W_A, the value of W_{A_1} relative to the total target is:

$$W'_{A_1}=\begin{bmatrix}0.0957 & 0.5237 & 0.1775 & 0.0364\end{bmatrix}^T. \tag{9}$$

3.3 The Estimating Matrix of Secondary Indicators is Shown in Table 5

Table 5. Estimating matrix for second grade index U_{13}

U_{13}	U_{131}	U_{132}	U_{133}	U_{134}	U_{135}	U_{136}	U_{137}	U_{138}
U_{121}	1	2	2	3	3	5	5	5
U_{122}	1/2	1	2	2	3	3	5	5
U_{123}	1/2	1/2	1	2	2	3	2	5
U_{124}	1/3	1/2	1/2	1	1/3	1/3	2	5
U_{125}	1/3	1/3	1/2	3	1	3	5	5
U_{126}	1/5	1/3	1/3	3	1/3	1	5	5
U_{127}	1/5	1/5	1/2	1/2	1/5	1/5	1	5
U_{138}	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1

The corresponding matrix of U_{13} which is generated from Table 5 is:

$$A_{13}=\begin{bmatrix} 1 & 2 & 2 & 3 & 3 & 5 & 5 & 5 \\ 1/2 & 1 & 2 & 2 & 3 & 3 & 5 & 5 \\ 1/2 & 1/2 & 1 & 2 & 2 & 3 & 2 & 5 \\ 1/3 & 1/2 & 1/2 & 1 & 1/3 & 1/3 & 2 & 5 \\ 1/3 & 1/3 & 1/2 & 3 & 1 & 3 & 5 & 5 \\ 1/5 & 1/3 & 1/3 & 3 & 1/3 & 1 & 5 & 5 \\ 1/5 & 1/5 & 1/2 & 1/2 & 1/5 & 1/5 & 1 & 5 \\ 1/5 & 1/5 & 1/5 & 1/5 & 1/5 & 1/5 & 1/5 & 1 \end{bmatrix}. \quad \textbf{(10)}$$

Then the corresponding index weight of A_{13} is:

$$W_{A_{13}}=\begin{bmatrix}0.2723 & 0.2046 & 0.1460 & 0.0703 & 0.1372 & 0.0983 & 0.0468 & 0.0245\end{bmatrix}^T. \quad \textbf{(11)}$$

In addition, $A_{13}W_{A_{13}}=\begin{bmatrix}0.24439 & 1.8362 & 1.3103 & 0.6308 & 1.2312 & 0.8825 & 0.4198 & 0.2196\end{bmatrix}^T$, then the corresponding maximum eigenvalue is:

$$\lambda_{A_{13}}=8.9742. \quad \textbf{(12)}$$

According to $CI=\frac{\lambda_{A_{13}}-8}{7}=0.139$ 、 $RI=1.41$, we can calculate $CR=\frac{CI}{RI}=0.0987<0.1$, the estimating matrix meets the requirement of consistency.

In summary, the actual weight of all the three-level indicators corresponding to the security risk of mobile office system is shown in Table 6.

Table 6. Actual weight of third grade index for system self-safe

No	Index	$\frac{U_{13}}{0.1775}$	Actual weight relative to total objective
1	U_{131}	0.2723	0. 0483
2	U_{132}	0.2046	0. 0363
3	U_{133}	0.1460	0. 0259
4	U_{134}	0.0703	0. 0125
5	U_{135}	0.1372	0. 0244
6	U_{136}	0.0983	0. 0174
7	U_{137}	0.0468	0. 0083
8	U_{138}	0.0245	0. 0043

3.4 The Estimating Matrix of the First Level Index U_2 is Shown in Table 7

Table 7. Estimating matrix for first grade index U_2

U_2	Confidentiality U_{21}	Reliability U_{22}
Confidentiality U_{21}	1	2
Reliability U_{22}	1/2	1

The paired comparison matrix generated from Table 7 is:

$$A_2 = (b_{ij})_{m\times n} = \begin{bmatrix} 1 & 2 \\ 1/2 & 1 \end{bmatrix}. \tag{13}$$

The corresponding index weight of A_2 is:

$$A_2 W_{A_2} = \begin{bmatrix} 1.3333 & 0.6667 \end{bmatrix}^T. \tag{14}$$

Then,

$$\lambda_{A_2} = 2. \tag{15}$$

In addition, $CI = \dfrac{\lambda_{A_2} - 2}{1} = 0$, Therefore, the estimating matrix A_2 meets the requirement of consistency. The total target of W_{A_2} is:

$$W'_{A_2} = \begin{bmatrix} 0.1111 & 0.0556 \end{bmatrix}^T. \tag{16}$$

3.5 The Estimating Matrix of Second Grade Index U_{22} is Shown in Table 8

Table 8. Estimating matrix for second grade index U_{22}

U_{22}	U_{221}	U_{222}	U_{223}	U_{224}	U_{225}	U_{226}	U_{227}	U_{228}	U_{229}	U_{2210}
U_{221}	1	3	2	1	1	1	1/2	1/2	1/3	1/3
U_{222}	1/3	1	1/2	1/3	1/3	1/3	1/5	1/5	1/7	1/7
U_{223}	1/2	2	1	1/2	1/2	1/2	1/3	1/3	1/4	1/4
U_{224}	1	3	2	1	1	1	1/2	1/2	1/3	1/3
U_{225}	1	3	2	1	1	1	1/2	1/2	1/3	1/3
U_{226}	1	3	2	1	1	1	1/2	1/2	1/3	1/3
U_{227}	2	5	3	2	2	2	1	1	1/2	1/2
U_{228}	2	5	3	2	2	2	1	1	1/2	1/2
U_{229}	3	7	4	3	3	3	2	2	1	1
U_{2210}	3	7	4	3	3	3	2	2	1	1

The pairwise comparison matrix according to U_{22} is:

$$A_{22}=\begin{bmatrix} 1 & 3 & 2 & 1 & 1 & 1 & 1/2 & 1/2 & 1/3 & 1/3 \\ 1/3 & 1 & 1/2 & 1/3 & 1/3 & 1/3 & 1/5 & 1/5 & 1/7 & 1/7 \\ 1/2 & 2 & 1 & 1/2 & 1/2 & 1/2 & 1/3 & 1/3 & 1/4 & 1/3 \\ 1 & 3 & 2 & 1 & 1 & 1 & 1/2 & 1/2 & 1/3 & 1/3 \\ 1 & 3 & 2 & 1 & 1 & 1 & 1/2 & 1/2 & 1/3 & 1/3 \\ 1 & 3 & 2 & 1 & 1 & 1 & 1/2 & 1/2 & 1/3 & 1/3 \\ 2 & 5 & 3 & 2 & 2 & 2 & 1 & 21 & 1/2 & 1/2 \\ 2 & 5 & 3 & 2 & 3 & 2 & 1 & 1 & 1/2 & 1/2 \\ 3 & 7 & 4 & 3 & 3 & 3 & 2 & 2 & 1 & 1 \\ 3 & 7 & 4 & 3 & 3 & 3 & 2 & 2 & 1 & 1 \end{bmatrix}. \quad \textbf{(17)}$$

The index weight according to A_{22} is:

$$W_{A_2}=\begin{bmatrix}0.0688 & 0.0244 & 0.0411 & 0.0688 & 0.0688 & 0.0688 & 0.1242 & 0.1242 & 0.2056 & 0.2056\end{bmatrix}^T. \quad \textbf{(18)}$$

Then,

$$A_{22}W_{A_2}=\begin{bmatrix}0.6914 & 0.2450 & 0.4129 & 0.6914 & 0.6914 & 0.6914 & 1.2490 & 1.2490 & 2.0677 & 2.0677\end{bmatrix}^T. \quad \textbf{(19)}$$

The Maximum eigenvalue is:

$$\lambda_{A_{22}}=10.0570. \quad \textbf{(20)}$$

In addition, $CI=\frac{\lambda_{A_{22}}-10}{9}=0.1737$ 、 $RI=1.49$, $CR=\frac{CI}{RI}=0.04<0.1.$ Therefore, the estimating matrix A_{22} meets the requirement of consistency.

In summary, the actual weight of all three-level indicators corresponding to the security risk of mobile office system operation process relative to the overall objective is shown in Table 9.

Table 9. Actual weight of system relative to general purpose of U22

No	Index	$\frac{U_{22}}{0.0556}$	Actual weight relative to total objective
1	U_{221}	0.0688	0.0038
2	U_{222}	0.0244	0.0014
3	U_{223}	0.0411	0.0023
4	U_{224}	0.0688	0.0038
5	U_{225}	0.0688	0.0038
6	U_{226}	0.0688	0.0038
7	U_{227}	0.1242	0.0069
8	U_{228}	0.1242	0.0069
9	U_{229}	0.2056	0.0114
10	U_{2210}	0.2056	0.0114

4 Evaluation Model and Analysis of Evaluation Results

4.1 Establish the System Security Risk Assessment Factor Set

By the mobile office system security risk evaluation sets:, based on the evaluation set, first of all 15 security experts, 10 senior users and five partners by secret ballot for three-level index scores, the result

as shown in Table 10, and then through the statistical analysis of the table to get fuzzy comprehensive evaluation model of evaluation set [7].

Table 10. Actual weight of third grade index for security risk U22 of system running process

Evaluation set / Three level index	Very high	High	Normal	Low	Very low
U_{221}	4	6	2	9	9
U_{222}	7	3	6	5	9
U_{223}	3	4	7	7	9
U_{224}	6	6	5	5	8
U_{225}	0	6	9	11	4
U_{226}	5	4	8	7	6
U_{227}	6	1	3	9	11
U_{228}	4	4	9	3	10
U_{229}	8	2	6	9	5
U_{2210}	9	2	4	10	5

4.2 Determine the Fuzzy relation Matrix of the Three-level Index of Mobile Office System Security risk

According to Table 10, the membership vector of the tertiary index can be obtained as shown in Table 11.

Table 11. Degree of the vector subordinated to third grade index

Three level index	Membership Vector of Three Level Indicators
U_{131}	(5/30, 4/30, 5/30, 9/30, 7/30)
U_{132}	(4/30, 1/30, 6/30, 13/30, 6/30)
U_{133}	(5/30, 3/30, 5/30, 9/30, 8/30)
U_{134}	(4/30, 7/30, 3/30, 9/30, 7/30)
U_{135}	(0/30, 7/30, 8/30, 8/30, 7/30)
U_{136}	(6/30, 3/30, 7/30, 9/30, 5/30)
U_{137}	(1/30, 7/30, 8/30, 9/30, 5/30)
U_{138}	(3/30, 6/30, 7/30, 8/30, 6/30)
U_{221}	(4/30, 6/30, 2/30, 9/30, 9/30)
U_{222}	(7/30, 3/30, 6/30, 5/30, 9/30)
U_{223}	(3/30, 4/30, 7/30, 7/30, 9/30)
U_{224}	(6/30, 6/30, 5/30, 5/30, 8/30)
U_{225}	(0/30, 6/30, 9/30, 11/30, 4/30)
U_{226}	(5/30, 4/30, 8/30, 7/30, 6/30)
U_{227}	(6/30, 1/30, 3/30, 9/30, 11/30)
U_{228}	(4/30, 4/30, 9/30, 3/30, 10/30)
U_{229}	(8/30, 2/30, 6/30, 9/30, 5/30)
U_{2210}	(9/30, 2/30, 4/30, 10/30, 5/30)

The safety evaluation system of mobile office system is safety and reliability. Therefore, this paper based on the multi-stage mobile office system practical application of the whole process, clear the definition of safety and reliability system, framework, elements, and combined with fuzzy comprehensive evaluation method application examples, reframe evaluation index selection principle and selection method, which as a possible risk events for judgement and prevention provide a theoretical basis and practice guidance.

4.3 Calculation of System Security Risk Assessment Results

According to the fuzzy comprehensive evaluation method and the fuzzy relation matrix generated by table 11, the fuzzy comprehensive evaluation result of security risk of mobile office system can be written:

$$B = W^{\circ}R = \left[0.1426 \quad 0.1488 \quad 0.1900 \quad 0.3048 \quad 0.2138\right]. \tag{21}$$

Therefore, the maximum membership degree of security risk of mobile office system is "low", which verifies the accuracy and reliability of the new model [8].

5 Conclusion

Through in-depth analysis of the problems of mobile office system safety and reliability, established on the basis of the constituent elements reliable security risk comprehensive evaluation of the new model, proposed the system constitute the main body and the process of running a set of safety and reliability index system, using the fuzzy system and simulation system is put forward by the comparative analysis, further verify the mobile office system safety assessment system safety and reliability. Therefore, this paper based on the multi-stage mobile office system practical application of the whole process, clear the definition of safety and reliability system, framework, elements, and combined with fuzzy comprehensive evaluation method application examples, reframe evaluation index selection principle and selection method, which as a possible risk events for judgement and prevention provide a theoretical basis and practice guidance.

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